

## IN THE SPECIFICATION

Please replace Paragraph [0007] as follows:

[0007] The second component of the catalyst system according to the present invention is a coordination complex of a metal selected from the group consisting of groups IIIA and IIIB of the periodic system, lanthanides and actinides with a tetrapyrrole compound. Without wishing to be bound to any particular theory, it is believed that the positively charged metal/tetrapyrrole ligand coordination complex acts as a Lewis acid by coordinating the epoxide, thereby promoting the insertion of the carbon monoxide into the thus activated epoxide bond. The oxidation state of the metal atoms during the carbonylation of epoxides may vary substantially as well as change during the course of the reaction. Preferably, these metals form, in oxidation state +III, a stable, positively charged coordination complex with the tetrapyrrole compound, which acts as a tetradentate dianionic ligand. Therefore, the metal preferably resides in an oxidation state of +III, thereby providing two free valences which may act as binding sites to the tetrapyrrole ligand, whereas the third free valence acts as a positive charge whereby the metal coordination complex acts as counter-ion to the anionic cobalt carbonyl complex. Preferred metals are ~~aluminium~~ aluminum, indium, gallium, scandium, ytterbium, lanthanum, cerium and samarium. Of these, ~~aluminium~~ aluminum is the most preferred due to its commercial availability and to the high stability of ~~aluminium~~ aluminum (III) complexes. Accordingly, the present invention preferably is directed to a process, wherein at least part of the metal in the second component is ~~aluminium~~ aluminum.

Please replace paragraph [0008] as follows:

[0008] Tetrapyrrole compounds in the second component are members of a class of compounds whose molecules have four pyrrole rings which can act as dianionic tetradentate ligands with metal atoms. Common arrangements of the pyrrole rings may be macrocyclic or linear. Preferred are the tetrapyrrole macrocyclic rings commonly denominated as ~~porphyrines~~ porphyrins. These ~~porphyrines~~ porphyrins contain a fundamental skeleton of four pyrrole nuclei united through the  $\alpha$ -positions by four methine groups to form a macrocyclic structure. The ~~porphyrines~~ porphyrins ligands suitable for use according to the present process may bear one or more alkyl substituents such as methyl

ethyl, n- and isopropyl and butyl, aryl substituents such as optionally substituted phenyl substituents, and substituents comprising heteroatoms at any position other than the nitrogen atoms of the pyrrole rings. One or more of these substituents other than hydrogen atoms may be present at the positions 2, 3, 5, 7, 8, 10, 12, 13, 15, 17, 18 and 20 of the ~~porphyrine~~ porphyrin nucleus (as defined by the IUPAC in the recommendations 1978, Pure Appl. Chem. 51, 2251-2304, 1979). Accordingly, the present invention preferably is directed to the subject process wherein the tetrapyrrole compound is a ~~porphyrine~~ porphyrin compound. More preferred ~~porphyrines~~ porphyrins include tetraaryl-~~porphyrines~~ porphyrins such as (5, 10, 15, 20-tetraphenyl)-~~porphyrine~~porphyrin, tetrakis-(4-methoxyphenyl)-~~porphyrine~~porphyrin, tetrakis-(2-methoxyphenyl)-~~porphyrine~~porphyrin, tetrakis-(2-chlorophenyl)-~~porphyrine~~porphyrin, tetrakis-(2-hydroxyphenyl)-~~porphyrine~~porphyrin and tetrakis-(2,4-dimethoxyphenyl)-~~porphyrine~~porphyrin. Other suitable tetrapyrrole ligands are di-benzo-~~porphyrine~~porphyrin and tetra-benzo-~~porphyrine~~porphyrin and cyclopenta-~~porphyrine~~porphyrin, and the naturally occurring members of the ~~porphyrine~~ porphyrin family. Most preferred due to the commercial availability and proven efficacy is (5,10,15,20-tetraphenyl) ~~porphyrine~~porphyrin.

Please replace paragraph [0011] as follows:

**[0011]** Step (a) of the catalyst preparation process is the synthesis of the metal-ligand coordination complex. This may be achieved by bringing a suitable metal source in contact with the selected tetrapyrrole ligand, for instance by using the method as described by Aida and Inoue in J. Am. Chem. Soc. 1983, 105, 1304-1309. The metal ligand complex formed may be directly converted further, or isolated at this stage. Without wishing to be bound to any particular theory, it is believed that in the metal coordination complex, the metal ion is coordinated to the tetrapyrrole as a tetradentate dianionic ligand, having one or more additional axial ligands. Preferably due to the proven high reactivity the source of a metal of step (a) comprises aluminum ~~aluminium~~. Even more preferably, the tetrapyrrole compound is a ~~porphyrine~~ porphyrin compound. Accordingly the present invention preferably is directed to a process for the preparation of a catalyst system, wherein the

metal in step (a) is aluminum ~~aluminium~~, and to a system wherein the tetrapyrrole compound is a ~~perphyrine~~ porphyrin compound.

Please replace paragraph [0018] as follows:

[0018] A suitable solvent is inert in the carbonylation reaction, meaning that it is not consumed during the course of the reaction. Suitable solvents for the process according to the present invention will ~~sellubilise~~ solubilize the feeds during the course of the reaction. Such solvents include cyclic or linear ethers of diols such as tetrahydrofuran (thf) and alkyl substituted furans, or diethylene glycol dimethyl ether (diglyme) due to their high solvency. It has, however, been observed that the reaction can proceed more smoothly and faster in absence of additional solvent. Therefore, the present process more preferably is performed in liquid product and in the absence of additional solvents.

Please replace paragraph [0026] as follows:

[0026] A 250 ml Hastelloy C reactor (Hastelloy C is a registered trademark of Haynes International Inc.) equipped with a magnetic stirrer, a heating unit and an inlet was charged with 50 ml diethylene glycol dimethyl ether (diglyme) and the catalyst precursors (97 mg (0.5 mmol) of  $\text{Na}[\text{Co}(\text{CO})_4]$ , 337 mg (0.5 mmol) of (5, 10, 15, 20-tetraphenyl)-~~perphyrine~~porphyrin aluminum ~~aluminium~~ chloride), then purged with nitrogen, and finally pressurized with carbon monoxide (CO) to a pressure of  $10 \times 10^5 \text{ N/m}^2$ . Then 15 ml (307 mmol) of ethylene oxide (EO) were pumped into the reactor. The pressure in the reactor was then increased further with CO to  $50 \times 10^5 \text{ N/m}^2$ , and further with hydrogen to the final pressure of  $70 \times 10^5 \text{ N/m}^2$ . Then the reactor was heated to  $70^\circ \text{C}$  and kept at this temperature for a period of 10 hours under vigorous stirring. At the end of the reaction, the gas consumption was determined as  $20 \times 10^5 \text{ N/m}^2$ .

Please replace paragraph [0029] as follows:

[0029] Example 1 was repeated, however, employing the cobalt-containing aluminum ~~aluminium~~ -salen catalyst system as described in J. Am. Chem. Soc. 124, 2002, 5646-5647,

and ethylene oxide as substrate. The resulting TON was determined by GC-analysis as 98 at 32% conversion.